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Original Paper

Smartphone Addiction and Health Issues among Young Adults in India: A Cross Sectional Study

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Abstract

Purpose*: Since smartphone usage across the world has increased in the recent years, the present study aims to explore smartphone addiction in young college going adults and common factors associated with it.* ***Method****: 306 female college students volunteered to be part of this study. Demographic information including smartphone usage and sleeping hours per day were collected using a self-administered questionnaire. Smartphone Addiction Scale (SAS) was used to evaluate level of addiction to smartphone.* ***Results and discussion****: SAS score of participants was 137.64, which shows higher rate of addiction to smartphone. 27.1% of the participants complained of pain and other health related symptoms, 66.3% reported awareness of symptoms occurring due to mobile overuse, 34.6% reported changes in sleeping pattern and 43.5% in sleeping hours.* ***Conclusion****: A higher rate of addiction to smartphone is associated with negative effects on health, social life and might present difficulties to performance in education.*

Keywords

Smartphone, addiction, smartphone Addiction Scale, health issues, young adults

1. Introduction

Smartphones are mobile phones with advanced features that are used widely for purposes other than the basic needs of communication. It has potentially replaced the features provided by computers and laptops including internet browsing, gaming, listening to music and watching videos to name a few and

thus has inevitably become a need rather than a luxury in the life of individuals, becoming ubiquitous. This has led to a new kind of health hazard among young population termed as smartphone addiction. Addiction can be described as dependence, the continuous use of something for the sake of relief, comfort or stimulation, which often causes cravings when absent (WHO Expert Committee, 1964). Addiction can be categorized either as substance addiction or behavioural addiction. Smartphone addiction can be considered as a behavioural addiction related to media which includes a craving or compulsion, loss of control of usage, and persistence in behaviour despite accruing adverse consequences (Shaffer, 1999). Smartphone addiction is no different from any other substance addiction and is considered one of the most prevalent addiction that is not drug related. “Smartphone addiction” (Casey, 2012; Kwon et al., 2013), “mobile phone addiction” (Ahmed, 2011; Park, 2005; Szpakow, 2011), “problematic mobile phone use” (Billieux, 2008; Takao, Takahashi, & Kitamura, 2009), “mobile phone dependence” (Ch ódiz, 2012; Satoko, 2009), “compulsive mobile phone use” (Matthews, 2009) and “mobile phone overuse” (Perry, 2007), are some of the synonymous terms used to describe this addiction among different population. India is the second biggest smartphone market in terms of active smartphone users and only next to China. With the number of users crossing 220 million in February 2016, according to a report by Counterpoint Research, it has reached all segments of population from all parts of the society. From 5% rise in usage of smartphone among young adults in 2012, there was a steep rise to 25% in the usage in 2014 (Katz, 2002).

Few studies in the past studied internet addiction among various age groups (Jung, 2013; Bonetti, 2010). Some focused on the patterns of smartphone usage, attitude of youth towards cellular phones (Subba et al., 2013), others have examined the antecedents and consequences of smartphone addiction (Park, 2014). As for the available literature, few studies have focused on smartphone addiction like studies conducted in Taiwan (Lin, 2014), Korea (Cho & Lee, 2015; Kwon, Kim, Cho, & Yang, 2013; Kwon et al., 2013), India (Davey, S. & Davey, A., 2014), US (Roberts, 2014; Smetaniuk, 2014) Swtizerland (Haug, 2015), Iran (Nastaran Norouzi Parashkouh, 2016), Saudi (Fahad, 2016), Turkey (Hatice Kahyaoglu Sut, 2016) and Tanzania (Lusekelo Kibona, 2015). Studies have not clearly addressed smartphone addiction in Indian population, presenting with scanty literature and inconclusive evidence. A thorough literature search suggested the need for further studies to explore smartphone addiction among young adults and this present study focused on determining the prevalence of smartphone addiction in young adults and exploring the possible effect it has on health and factors associated with it.

2. Methods

A homogenous population of college students were selected for this study as it is helpful in improving the internal validity and also this age group had higher adoption rates to smartphone. Prior permission to conduct the study was obtained from the Head of the Departments of the concerned institutions. The purpose and objectives of the study were explained to the participants at the beginning of the study. They were also explained that the confidentiality of the collected data will be maintained and used only for

research purpose. They were allowed to participate in the study only after obtaining a written consent, allowing them to withdraw from participation at any point of time.

Data was collected using a self-administered demographic questionnaire and the Smartphone Addiction Scale (SAS).

The demographic questionnaire included the participant's age, hand dominance, preferred hand use while handling phone, approximate number of sleeping hours per day, number of hours of phone usage, duration since ownership of smartphone and type of mobile phone used. It also included questions regarding the common purpose of smartphone use like receiving and making calls, use of video calls, messaging services including social messaging using specific applications (Whatsapp, face book or twitter), listening to music, playing games, taking photographs or videos of self and others, watching videos and movies and reading. The most common position used while phone usage was also obtained.

The second component of this questionnaire obtained information regarding any health issues faced by the participants, specifically pain in the past one year and the region affected. They were asked if they are aware of the symptoms that occur due to overuse of smartphones and precautions taken by them to prevent or overcome the symptoms. Data collected also included the perception of the participants towards change in the pattern and hours of sleeping as a result of smartphone usage.

Developed by Kwon et al. (2013) to measure the addiction levels of smartphone users, SAS consists of a six-point Likert-type scale with 48 items and six subscales (daily-life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, and tolerance).

"Daily-life disturbance" (DLD) includes missing planned work, having a hard time concentrating in class or while working, suffering from lightheadedness or blurred vision, pain on the wrists or at the back of the neck, and sleeping disturbance. "Positive anticipation" (PA) is described as feeling excited about and getting rid of stress with smartphone use, and feeling empty without a smartphone. "Withdrawal" (WD) involves being impatient, fretful, and intolerable without a smartphone, constantly having one's smartphone in one's mind even while not using it, never giving up using one's smartphone, and becoming irritated when bothered while using one's smartphone. "Cyberspace-oriented relationship" (COR) includes questions about the feeling that one's relationships with his/her friends obtained through a smartphone are more intimate than his/her relationships with his/her real-life friends, experiencing an uncontrolled feeling of loss when not able to use one's smartphone, and consequently constantly checking one's smartphone. "Overuse" (OU) refers to the uncontrollable use of one's smartphone, preferring to conduct searches using one's smartphone to asking help from other people, always preparing one's charging pack, and feeling the urge to use one's smartphone again right after one stopped using it. The last factor, "tolerance" (TOL) was defined as always trying to control one's smartphone use but always failing to do so.

14 items that were removed from the above study were retained by the authors under a subscale "Miscellaneous" (Misc) which covered the negative aspects of phone usage like without phone being incapable to do anything, experiencing auditory hallucinations, feeling depressed, bored and stressed,

not being able to keep appointments and using it where they were not supposed to. The seven subscales' scores are summed up to yield a total SAS score with a 48-288 range, where a higher score indicates more serious smartphone addiction. Internal consistency (Cronbach alpha) of the SAS was reported to be 0.96 by Kwon et al.

Descriptive statistics (mean, standard deviation, frequency and percentage) were used to represent the categorical and continuous data. As the collected data were not normally distributed, Mann Whitney Test was used to compare the means of SAS scores in presence of pain symptoms and awareness of pain symptoms due to mobile overuse. Kruskal-Wallis Test was used to compare the means of SAS scores in hours of mobile phone use and duration of ownership of mobile. Spearman Correlation coefficient test were used to determine the correlation of SAS scores and sub scale scores with hours of phone use, duration of mobile ownership, presence of pain symptoms and awareness to symptoms due to mobile overuse.

Since there were higher number of female students in this study (306) as compared to male participants (43), data analysis was performed and results discussed only for female students.

Statistical analysis was done by SPSS 20.0 statistical software (IBM Corp. IBM SPSS Statistics for Windows, Version 20.0. NY: IBM Corp.), and the p value at <0.05 was accepted as statistically significant.

3. Results

Mean age of participants was 19.33 ± 1.33 and ranged from 17 years to 26 years. Average sleeping hours of participants was 7.26 ± 1.06. Demographic variables of participants are listed in Table 1. About 86% of participants used mobile phone for less than 5 hours a day and almost 50% of them owned mobile phone for 2-4 years. While 95.4% used mobile phones for calling and receiving purposes, 92.2% used it for social networking like Whatsapp, facebook and twitter, 80.1% for taking selfie and 71.9% for listening to music. The preferred position of mobile phone use was supported sitting (80.4%), followed by unsupported sitting (68.3%) and lying (53.3%).

Table 1. Demographic Characteristics of Participants

Variables	n (%) (n=306)
Hand Dominance	
Right	278 (90.8)
Left	28 (9.2)
Hand Preference while using mobile	
Right	281 (91.8)
Left	25 (8.2)
Hours of mobile usage	
<5 Hours	265 (86.6)

6-10 Hours	37 (12.1)
>10 Hours	4 (1.3)
Duration of owning mobile	
1 Year	110 (35.9)
2-4 Years	152 (49.7)
5-7 Years	40 (13.1)
8-10 Years	2 (0.7)
>10 Years	2 (0.7)
Mobile Uses	
Direct Calls	292 (95.4)
Hands Free Calls	58 (19.0)
Video Calls	51 (16.7)
SMS	107 (35.0)
Social Networking	282 (92.2)
Music	220 (71.9)
Games	163 (53.3)
Selfie	245 (80.1)
Watching Videos and Movies	179 (58.5)
Reading E-books	134 (43.8)
Position of mobile usage	
Supported Sitting	246 (80.4)
Unsupported Sitting	209 (68.3)
Standing	26 (8.5)
Walking	15 (4.9)
Lying	163 (53.3)

* Multiple responses.

Pain and other health related issues in the past one year as perceived by the participants are represented in Table 2. 27.1% of the participants complained of symptoms ranging from head and neck pain (12.1%) to low back pain (9.2%).

Table 2. Self-reported Pain and Other Health Related Symptoms

Variables	n (%) (n=306)
Presence of pain	83 (27.1)
Eye Strain	23 (7.5)
Ear Problems	2 (0.7)
Head and Neck	37 (12.1)
Shoulder and Arm	17 (5.6)
Elbow and Forearm	4 (1.3)
Wrist and Hand	11 (3.6)

Upper Back	26 (8.5)
Lower Back	28 (9.2)
Lower Leg	5 (1.6)
Ankle and Foot	2 (0.7)

* Multiple responses.

Participant's awareness to symptoms induced by over use of mobile phones and the precautions or actions commonly employed by them to overcome these symptoms are shown in Table 3. 66% students were aware of the symptoms caused due to overuse of their phones and 40.3% would reduce the hours of use and 27.8% would reduce unwanted use of phone to alleviate the symptoms.

Table 3. Self-reported Awareness of Symptoms to Mobile Phone Overuse and Precautions Used

Variables	n (%) (n=306)
Awareness of Symptoms to mobile over use	203 (66.3)
Precautions and Actions	
Reduced hours of use	124 (40.3)
Reduced unwanted use	85 (27.8)
Adequate rest period	43 (14.1)
Medications for pain relief	9 (2.9)
Modify pattern and style of mobile use	65 (21.2)
Stopped using phone	8 (2.6)

* Multiple responses.

Perception of participants towards mobile use modifying their sleep patterns and hours of sleeping are shown in Table 4. 43.5% of students believed that the use of mobile phone affects their sleeping hours while 34.6% believed it affected their sleeping patterns.

Table 4. Self-reported Perception of Mobile Phone Use Affecting Sleep Pattern and Sleeping Hours

Variables	n (%) (n=306)
Affects sleeping pattern	106 (34.6)
Affects sleeping hours	133 (43.5)

* Multiple responses.

Mean total SAS scores and scores of subscales by selective demographic and pain related characteristics are shown in Table 5.

Table 5. SAS Total Score and Subscale Scores Analysis

	Total	DLD	PA	WD	COR	OU	TOL	Misc
Mean Scores								
Hours of use								
<5 Hours (n=265)	134.98±31.68	14.85±5.25	25.41±6.78	13.69±4.63	17.62±6.00	12.30±4.34	12.14±4.55	38.95±10.15
6-10 Hours (n=37)	155.45±34.72	16.81±5.59	27.21±6.64	16.54±5.46	20.70±6.96	15.29±4.10	15.27±3.77	43.62±11.55
>10 Hours (n=4)	148.75±35.10	16.50±4.12	29.00±5.71	15.00±8.36	18.50±4.12	16.00±6.00	12.50±1.91	41.25±11.52
p value	**0.003**	**0.147**	**0.307**	**0.010**	**0.035**	**0.000**	**0.000**	**0.100**
Duration of Owning mobile								
1 Year (n=110)	136.80±31.33	15.62±5.28	25.73±6.78	13.63±4.46	17.60±5.96	11.98±4.00	12.63±4.46	39.59±9.99
2-4 Years (n=152)	138.32±31.75	15.01±5.19	25.42±6.40	14.25±4.89	18.00±6.09	13.25±4.67	12.59±4.59	39.77±10.26
5-7 Years (n=40)	137.20±40.17	13.95±5.70	26.47±7.56	14.50±5.78	19.00±6.82	12.60±4.63	12.05±4.57	38.62±12.25
8-10 Years (n=2)	149.00±11.31	11.50±0.70	27.00±1.41	14.50±3.53	26.00±2.82	14.00±5.65	17.50±0.70	38.50±4.94
>10 Years (n=2)	129.00±56.56	21.00±5.65	24.00±22.62	12.50±9.19	12.50±7.77	13.00±2.82	6.00±1.41	40.00±21.21
p value	**0.927**	**0.090**	**0.939**	**0.919**	**0.210**	**0.284**	**0.109**	**0.961**
Presence of pain and related symptoms								
Yes (n=83)	141.72±32.01	17.12±5.46	25.56±6.32	14.25±4.64	18.48±6.40	12.89±4.58	13.79±4.62	39.61±10.35
No (n=223)	136.12±32.89	14.36±5.06	25.71±6.95	13.97±4.95	17.82±6.08	12.65±4.40	12.05±4.44	39.52±10.47
p value	**0.075**	**0.000**	**0.695**	**0.477**	**0.334**	**0.676**	**0.002**	**0.651**
Awareness of Symptoms to mobile over use								
Yes (n=203)	138.17±32.97	15.67±5.24	25.40±6.59	14.14±4.78	17.72±6.38	12.92±4.61	12.63±4.63	39.67±10.40
No (n=103)	136.59±32.29	14.01±5.29	26.20±7.11	13.86±5.03	18.56±5.71	12.30±4.09	12.32±4.41	39.32±10.52
p value	**0.607**	**0.005**	**0.335**	**0.582**	**0.101**	**0.257**	**0.571**	**0.922**

DLD: Daily Life Disturbance, PA: Positive Anticipation, WD: Withdrawal, COR: Cyberspace Oriented Relationship, OU: Overuse, TOL: Tolerance, Misc: Miscellaneous.

Number of hours of smartphone use per day was positively correlated with total score ($r=0.192$, $p<0.01$) and all sub scale scores of SAS (r range from 0.116 to 0.238, $p<0.05$) except PA ($r=0.084$) and DLD ($r=0.112$) (Table 6). Duration of ownership of mobile phone had no correlation with any of the SAS scores.

Table 6. Spearman Correlation Coefficient of SAS Total Score and Sub Scores with Smartphone Usage and Duration of Ownership of Mobile

SAS Scores	Hours of use	Duration of Owning mobile
Total	0.192**	0.016
DLD	0.112	-0.112
PA	0.084	0.008
WD	0.163**	0.045
COR	0.145*	0.066
OU	0.238**	0.102
TOL	0.216**	-0.039
Misc	0.116*	-0.005

DLD: Daily Life Disturbance, PA: Positive Anticipation, WD: Withdrawal, COR: Cyberspace Oriented Relationship, OU: Overuse, TOL: Tolerance, Misc: Miscellaneous.

Correlation is significant at the 0.01 level (2-tailed)**

Correlation is significant at the 0.05 level (2-tailed)*

Presence of pain and related symptoms were negatively correlated to DLD score ($r=-0.237$, $p<0.01$) and TOL score ($r=-0.193$, $p<0.01$). No correlation was found (Table 7) between the awareness of participants to mobile phone over use and all SAS scores except DLD which showed negative correlation ($r=-0.161$, $p<0.01$).

Table 7. Spearman Correlation Coefficient of SAS Total Score and Sub Scores with Pain Symptoms and Awareness to Symptoms

SAS Scores	Presence of pain and related symptoms	Awareness of Symptoms to mobile over use
Total	-0.102	-0.029
DLD	-0.220**	-0.161**
PA	0.022	0.055
WD	-0.041	-0.031
COR	-0.055	0.094
OU	-0.024	-0.065
TOL	-0.181**	-0.032
Misc	-0.026	-0.006

DLD: Daily Life Disturbance, PA: Positive Anticipation, WD: Withdrawal, COR: Cyberspace Oriented Relationship, OU: Overuse, TOL: Tolerance, Misc: Miscellaneous.

Correlation is significant at the 0.01 level (2-tailed)**

Correlation is significant at the 0.05 level (2-tailed)*

4. Discussion

Mobile phone technology is predominantly used for better calling and receiving services. Mobile networks have made communication easier, comfortable and convenient. But in today's case scenario, mobile phones are used for purposes other than making and receiving calls. These include social networking, internet usage, photography, listening to music, watching movies and clips to name a few. Since mobile phones have become an integral lifeline for today's generation of young and old, this study explored the pattern of usage of mobile phones among young adults, the possible health related symptoms perceived by them and also focused on the intensity of addiction to smartphone.

Majority of the participants from this study used mobile phone for less than 5 hours per day (86%), similar to results from studies by Demirci et al. (2014) who reported 71.4% using it for less than 4 hours per day. Study from Turkey (Hatice Kahyaoglu Sut, 2016) found 40.1% of participants using mobile phone for 4-6 hours per day. Results from the present study show 92% of participants using their mobile phone for social networking, which was next to calling purpose (95.4%). The percentage of mobile phone use for social networking found in this study was higher than most of the studies on smartphone addiction except the study by Fahad et al. (2016) who reported 94.7% using mobile for social networking.

SAS scores are calculated based on the 6 point likert scale for 48 items with a minimum score of 6 and a maximum score of 288. Higher scores indicated severity in addiction to smart phone. We graded the addiction into three categories as mild, moderate and severe by considering less than one third of the total score (96) as mild, two thirds of total score (192) as moderate and above two thirds (>192) as severe.

Mean total SAS score was 137.64 as per the results of the present study which showed higher rates of addiction as compared to studies from Turkey (Hatice Kahyaoglu Sut, 2016) with a score of 84 and , Korea (Kwon et al., 2013) with a score of 110.

Prevalence of smartphone addiction as per the results of the present study was 88%. This included combined scoring of participants in the moderate and severe addiction categories. A meta-analysis published in 2014 (Davey, S. & Davey, A., 2014), reported 39% to 44% of Indian adolescents addicted to smartphone, which was much lower as compared to the results from our study.

Total SAS scores showed significant difference in hours of phone use ($p=0.003$), in which participants using mobiles 6-10 hours per day scored high, whereas no significant differences were found in other characteristics compared.

When the means of subscales of SAS were compared significant differences were observed between hours of phone usage and WD, COR, OU and TOL sub scales of SAS. However, there was no statistical significance in other subscale scores. Similarly, no significant differences were observed between sub scores of SAS and duration of owning mobile (Table 5). Subscale scores of DLD and TOL were high in participants who reported presence of pain and related symptoms ($p=0.000$ and 0.002 respectively) and DLD score was significantly high in participants who were aware of the symptoms of

mobile phone over use (p=0.005).

Total SAS scores and number of hours of mobile phone usage were positively correlated (Table 6, 7). The common symptoms as reported by the participants were head and neck pain (12.1%), low back pain (9.2%) followed by upper back pain (8.5%).

Despite 66% of the participants reporting that they were aware of the symptoms caused by mobile overuse, only 2.6% have stopped using mobile phones. A combined 80% reported excessive use of mobile phone affected their sleep habits including the number of hours they sleep and their sleep pattern. This addiction to mobile phone leads to physiological health hazards including visual disturbances, ear problems, headaches, fatigue and other musculoskeletal symptoms. It also has an added negative psychological effect which might be asymptomatic and affect the performance of the individual in personal and professional life.

5. Conclusion

On the basis of the results from the present study we found higher rates of smart phone addiction among young Indian adults, which is a matter of concern. Since younger population are more inclined towards using smartphones for activities other than communication, it may affect them at personal, psychological, physical and societal levels. More focus and attention needs to be paid towards these issues in this population as youngsters become more susceptible to fashion trends making them more techno savvy landing them in overuse. Further studies to compare if differences exist between genders in smart phone addiction and usage can be conducted. Also, experimental studies to determine and examine the effects of various possible methods to overcome smartphone addiction among younger generation are recommended.

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